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Form Analysis.—Slowly but surely the necessity of applying precise mathematical methods to the solution of many biological problems is becoming apparent to workers in both fields. The chief application of mathematical methods has been in the study of variation and heredity, but the problems of leaf form, arrangement of leaves on the stem, and the convolutions of the shells of gastropods may be mentioned as having attracted the attention of mathematical workers. In an address before the American Philosophical Society, Michelson¹ emphasizes the importance of the problems of symmetry and suggests a classification of symmetrical and unsymmetrical forms.

J. A. HARRIS

GEOLOGY

River terraces at Brattleboro, Vt.—Professor Fisher² has tested the theory that the river terraces of New England may be accounted for by the behavior of meandering and swinging streams slowly degrading previously aggraded valleys without necessary change in volume and by the control exerted here and there over the lateral swinging of the streams through the discovery of rock ledges, by applying the theory to the explanation of the terraces of the West River near its junction with the Connecticut. It is found that this theory, elaborated by Davis some years ago, is the only one which will adequately account for the features presented in the district under study.

The lateral swinging of rivers by meanders, cut-offs, and short-cuts is considered, and the evidence in favor of a fourth process presented. This latter, called the 'partition process,' results when a sudden withdrawal of the current from banks of erosion is effected, the stream then forming a sand bar which is not continuous with the former banks, and the sand bar grows to an island which parts the stream. Eventually the deeper channel acquires the entire stream, the deserted channel and former island being thus added to the flood plain. The West River, swinging by these various processes, and at

¹ Michelson, A. A. "Form Analysis." *Proc. Amer. Phil. Soc.*, vol. 45, pp. 110-116, 1906.

² Terraces of the West River, Brattleboro, Vermont. By E. F. Fisher. *Proc. Bost. Soc. Nat. Hist.*, Vol. 33, pp. 9-42, pls. 1-11. 1906.

the same time slowly degrading its previously aggraded valley, has encountered numerous rock barriers in its down-cutting, these barriers controlling the extent and character of the lateral swinging, and thus determining the variety of terrace pattern described.

The paper is abundantly illustrated by block diagrams, engravings, and by maps and sections based on a careful survey of the region.

D. W. J.

ANTHROPOLOGY

Quaternary Remains of Man in Central Europe. By Hugues Obermaier.¹ The presence of man in central Europe in the Quaternary no longer admits of doubt. The finds of archeological and skeletal human remains dating back to that period, have been numerous and well authenticated. They have, in fact, become so numerous and publications concerning them are so scattered, that a good grasp of the whole subject is at present a matter of difficulty. Under these circumstances, Obermaier's effort to establish "a list of all the quaternary anthropological discoveries, discarding those the antiquity of which is disputable," is much to be commended. This is especially the case when we learn that the author endeavored to form his opinions by visiting the localities where the finds have been made, by personally examining the collections, and by consulting the men who made the discoveries.

The following succession of stages and substages during which man existed in Europe is admitted:

I. *2nd interglacial stage*

Substages: Chellean (fauna of a hot climate)

Acheulean (fauna of a hot temperate climate)

The Micoque phase (fauna of the steppes)

II. *3rd glacial stage*

Mousterian (fauna of cold climate)

III. *3rd interglacial stage*

Mousterian (fauna of temperate, then of hot climate)

Solutrean (fauna of temperate and finally of cold climate)

¹ Les restes humaines quaternaires dans l'Europe centrale. L'Anthropologie, XVI, 1905, pp. 385-410, XVII, 1906, 55-80.